



SEQUENCE LISTING

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JUL 29 2002
TECH CENTER 1600/2900

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GRANDI, Guido

<120> POLYPEPTIDE CARRIER PROTEIN

<130> PP00362.102 / 2302-0362

<140> 09/674,183

<141> 2000-11-14

<150> PCT/IB99/00844

<151> 1999-04-27

<150> GB9808932.9

<151> 1998-04-27

<160> 20

<170> PatentIn Ver. 2.1

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<211> 15

<212> PRT

<213> T-cell epitope P23TT

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Val Asn

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Ala Ser His Leu Glu
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Met Thr Leu Ala

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Ser His Asn Lys
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 <222> (1) .. (657)

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Tyr Lys Asp Asp Asp Asp Ile Glu Gly Arg Lys Gly Val Ser Ile Asp	
20 25 30	
aaa ttc cgt atc ttc tgc aaa gct aac ccg aaa aaa ggt ctg aaa ttc	144
Lys Phe Arg Ile Phe Cys Lys Ala Asn Pro Lys Lys Gly Leu Lys Phe	
35 40 45	
atc atc aaa cgt tac acc ccg aac aac gaa atc gac tcc aaa ggt atc	192
Ile Ile Lys Arg Tyr Thr Pro Asn Asn Glu Ile Asp Ser Lys Gly Ile	
50 55 60	
cgt gaa gac aac aac atc acc ctg aaa ctg gac cgt tgc aac aac aaa	240
Arg Glu Asp Asn Asn Ile Thr Leu Lys Leu Asp Arg Cys Asn Asn Lys	
65 70 75 80	
ggt gaa aag aag atc gct aaa atg gaa aaa gct tct tct gtt ttc aac	288
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85 90 95	
gtt gtt aac tct aaa ggt ttc aac aac ttc acc gtt tcc ttc tgg ctg	336
Val Val Asn Ser Lys Gly Phe Asn Asn Phe Thr Val Ser Phe Trp Leu	
100 105 110	
cgt gtt ccg aaa gtt tcc gct tcc cac ctg gaa aaa ggt cag tac atc	384
Arg Val Pro Lys Val Ser Ala Ser His Leu Glu Lys Gly Gln Tyr Ile	
115 120 125	
aaa gct aac tcc aaa ttc atc ggt atc acc gaa aaa ggt gga tct ccg	432
Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Lys Gly Gly Ser Pro	
130 135 140	
cat cat acc gcg ctg cgc cag gcg att ctg tgc tgg ggc gaa ctg atg	480
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145 150 155 160	
acc ctg gcg aaa gga tct ccg aaa tat gtg aaa cag aac acc ctg aaa	528
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165 170 175	
ctg gcg acc aaa gga tcg ttt ttt ctg ctg acc cgc att ctg acc att	576
Leu Ala Thr Lys Gly Ser Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile	
180 185 190	
ccg cag tct ctg gat aaa ggc tat tct ggc ccg ctg aaa gcg gaa att	624
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 35 40 45

Ile Ile Lys Arg Tyr Thr Pro Asn Asn Glu Ile Asp Ser Lys Gly Ile
 50 55 60

Arg Glu Asp Asn Asn Ile Thr Leu Lys Leu Asp Arg Cys Asn Asn Lys
 65 70 75 80

Gly Glu Lys Lys Ile Ala Lys Met Glu Lys Ala Ser Ser Val Phe Asn
 85 90 95

Val Val Asn Ser Lys Gly Phe Asn Asn Phe Thr Val Ser Phe Trp Leu
 100 105 110

Arg Val Pro Lys Val Ser Ala Ser His Leu Glu Lys Gly Gln Tyr Ile
 115 120 125

Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Lys Gly Gly Ser Pro
 130 135 140

His His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu Leu Met
 145 150 155 160

Thr Leu Ala Lys Gly Ser Pro Lys Tyr Val Lys Gln Asn Thr Leu Lys
 165 170 175

Leu Ala Thr Lys Gly Ser Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile
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Ala Gln Arg Leu Glu Asp Val Lys Gly Ser
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          20             25             30

aaa ttc cgt atc ttc tgc aaa gct aac ccg aaa aaa ggt ctg aaa ttc 144
Lys Phe Arg Ile Phe Cys Lys Ala Asn Pro Lys Lys Gly Leu Lys Phe
          35             40             45

atc atc aaa cgt tac acc ccg aac aac gaa atc gac tcc aaa ggt atc 192
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cgt gaa gac aac aac atc acc ctg aaa ctg gac cgt tgc aac aac aaa 240
Arg Glu Asp Asn Asn Ile Thr Leu Lys Leu Asp Arg Cys Asn Asn Lys
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ggt gaa aag aag atc gct aaa atg gaa aaa gct tct tct gtt ttc aac 288
Gly Glu Lys Lys Ile Ala Lys Met Glu Lys Ala Ser Ser Val Phe Asn
          85             90             95

gtt gtt aac tct aaa ggt ttc aac aac ttc acc gtt tcc ttc tgg ctg 336
Val Val Asn Ser Lys Gly Phe Asn Asn Phe Thr Val Ser Phe Trp Leu
          100            105            110

cgt gtt ccg aaa gtt tcc gct tcc cac ctg gaa aaa ggt cag tac atc 384
Arg Val Pro Lys Val Ser Ala Ser His Leu Glu Lys Gly Gln Tyr Ile
          115            120            125

aaa gct aac tcc aaa ttc atc ggt atc acc gaa aaa ggt gga tcc taa 432
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 Arg Glu Asp Asn Asn Ile Thr Leu Lys Leu Asp Arg Cys Asn Asn Lys
 65 70 75 80
 Gly Glu Lys Lys Ile Ala Lys Met Glu Lys Ala Ser Ser Val Phe Asn
 85 90 95
 Val Val Asn Ser Lys Gly Phe Asn Asn Phe Thr Val Ser Phe Trp Leu
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 20 25 30
 aaa ttc cgt atc ttc tgc aaa gct aac ccg aaa aaa ggt ctg aaa ttc 144
 Lys Phe Arg Ile Phe Cys Lys Ala Asn Pro Lys Lys Gly Leu Lys Phe
 35 40 45
 atc atc aaa cgt tac acc ccg aac aac gaa atc gac tcc aaa ggt atc 192
 Ile Ile Lys Arg Tyr Thr Pro Asn Asn Glu Ile Asp Ser Lys Gly Ile
 50 55 60
 cgt gaa gac aac aac atc acc ctg aaa ctg gac cgt tgc aac aac aaa 240
 Arg Glu Asp Asn Asn Ile Thr Leu Lys Leu Asp Arg Cys Asn Asn Lys
 65 70 75 80

ggt gaa aag aag atc gct aaa atg gaa aaa gct tct tct gtt ttc aac	288
Gly Glu Lys Lys Ile Ala Lys Met Glu Lys Ala Ser Ser Val Phe Asn	
85 90 95	
ggt gtt aac tct aaa ggt ttc aac aac ttc acc gtt tcc ttc tgg ctg	336
Val Val Asn Ser Lys Gly Phe Asn Asn Phe Thr Val Ser Phe Trp Leu	
100 105 110	
cgt gtt ccg aaa gtt tcc gct tcc cac ctg gaa aaa ggt cag tac atc	384
Arg Val Pro Lys Val Ser Ala Ser His Leu Glu Lys Gly Gln Tyr Ile	
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aaa gct aac tcc aaa ttc atc ggt atc acc gaa aaa ggt gga tct ccg	432
Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Lys Gly Gly Ser Pro	
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cat cat acc gcg ctg cgc cag gcg att ctg tgc tgg ggc gaa ctg atg	480
His His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu Leu Met	
145 150 155 160	
acc ctg gcg aaa gga tct ccg aaa tat gtg aaa cag aac acc ctg aaa	528
Thr Leu Ala Lys Gly Ser Pro Lys Tyr Val Lys Gln Asn Thr Leu Lys	
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ctg gcg acc aaa gga tcg ttt ttt ctg ctg acc cgc att ctg acc att	576
Leu Ala Thr Lys Gly Ser Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile	
180 185 190	
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Pro Gln Ser Leu Asp Lys Gly Tyr Ser Gly Pro Leu Lys Ala Glu Ile	
195 200 205	
gcg cag cgc ctg gaa gat gtg aaa gga tct gtt tcc atc gac aaa ttc	672
Ala Gln Arg Leu Glu Asp Val Lys Gly Ser Val Ser Ile Asp Lys Phe	
210 215 220	
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225 230 235 240	
aaa cgt tac acc ccg aac aac gaa atc gac tcc aaa ggt atc cgt gaa	768
Lys Arg Tyr Thr Pro Asn Asn Glu Ile Asp Ser Lys Gly Ile Arg Glu	
245 250 255	
gac aac aac atc acc ctg aaa ctg gac cgt tgc aac aac aaa ggt gaa	816
Asp Asn Asn Ile Thr Leu Lys Leu Asp Arg Cys Asn Asn Lys Gly Glu	
260 265 270	
aag aag atc gct aaa atg gaa aaa gct tct tct gtt ttc aac gtt gtt	864
Lys Lys Ile Ala Lys Met Glu Lys Ala Ser Ser Val Phe Asn Val Val	
275 280 285	
aac tct aaa ggt ttc aac aac ttc acc gtt tcc ttc tgg ctg cgt gtt	912
Asn Ser Lys Gly Phe Asn Asn Phe Thr Val Ser Phe Trp Leu Arg Val	

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ccg aaa gtt tcc gct tcc cac ctg gaa aaa ggt cag tac atc aaa gct			960
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305	310	315	320
aac tcc aaa ttc atc ggt atc acc gaa aaa ggt gga tct ccg cat cat			1008
Asn Ser Lys Phe Ile Gly Ile Thr Glu Lys Gly Gly Ser Pro His His			
	325	330	335
acc gcg ctg cgc cag gcg att ctg tgc tgg ggc gaa ctg atg acc ctg			1056
Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu Leu Met Thr Leu			
	340	345	350
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Ala Lys Gly Ser Pro Lys Tyr Val Lys Gln Asn Thr Leu Lys Leu Ala			
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acc aaa gga tgc ttt ttt ctg ctg acc cgc att ctg acc att ccg cag			1152
Thr Lys Gly Ser Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln			
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Lys	Phe	Arg	Ile	Phe	Cys	Lys	Ala	Asn	Pro	Lys	Lys	Gly	Leu	Lys	Phe		
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Ile	Ile	Lys	Arg	Tyr	Thr	Pro	Asn	Asn	Glu	Ile	Asp	Ser	Lys	Gly	Ile		
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Arg	Glu	Asp	Asn	Asn	Ile	Thr	Leu	Lys	Leu	Asp	Arg	Cys	Asn	Asn	Lys		
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Val	Val	Asn	Ser	Lys	Gly	Phe	Asn	Asn	Phe	Thr	Val	Ser	Phe	Trp	Leu		
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Arg	Val	Pro	Lys	Val	Ser	Ala	Ser	His	Leu	Glu	Lys	Gly	Gln	Tyr	Ile	115	120	125	
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His	His	Thr	Ala	Leu	Arg	Gln	Ala	Ile	Leu	Cys	Trp	Gly	Glu	Leu	Met	145	150	155	160
Thr	Leu	Ala	Lys	Gly	Ser	Pro	Lys	Tyr	Val	Lys	Gln	Asn	Thr	Leu	Lys	165	170	175	
Leu	Ala	Thr	Lys	Gly	Ser	Phe	Phe	Leu	Leu	Thr	Arg	Ile	Leu	Thr	Ile	180	185	190	
Pro	Gln	Ser	Leu	Asp	Lys	Gly	Tyr	Ser	Gly	Pro	Leu	Lys	Ala	Glu	Ile	195	200	205	
Ala	Gln	Arg	Leu	Glu	Asp	Val	Lys	Gly	Ser	Val	Ser	Ile	Asp	Lys	Phe	210	215	220	
Arg	Ile	Phe	Cys	Lys	Ala	Asn	Pro	Lys	Lys	Gly	Leu	Lys	Phe	Ile	Ile	225	230	235	240
Lys	Arg	Tyr	Thr	Pro	Asn	Asn	Glu	Ile	Asp	Ser	Lys	Gly	Ile	Arg	Glu	245	250	255	
Asp	Asn	Asn	Ile	Thr	Leu	Lys	Leu	Asp	Arg	Cys	Asn	Asn	Lys	Gly	Glu	260	265	270	
Lys	Lys	Ile	Ala	Lys	Met	Glu	Lys	Ala	Ser	Ser	Val	Phe	Asn	Val	Val	275	280	285	
Asn	Ser	Lys	Gly	Phe	Asn	Asn	Phe	Thr	Val	Ser	Phe	Trp	Leu	Arg	Val	290	295	300	
Pro	Lys	Val	Ser	Ala	Ser	His	Leu	Glu	Lys	Gly	Gln	Tyr	Ile	Lys	Ala	305	310	315	320
Asn	Ser	Lys	Phe	Ile	Gly	Ile	Thr	Glu	Lys	Gly	Gly	Ser	Pro	His	His	325	330	335	
Thr	Ala	Leu	Arg	Gln	Ala	Ile	Leu	Cys	Trp	Gly	Glu	Leu	Met	Thr	Leu	340	345	350	
Ala	Lys	Gly	Ser	Pro	Lys	Tyr	Val	Lys	Gln	Asn	Thr	Leu	Lys	Leu	Ala	355	360	365	
Thr	Lys	Gly	Ser	Phe	Phe	Leu	Leu	Thr	Arg	Ile	Leu	Thr	Ile	Pro	Gln	370	375	380	
Ser	Leu	Asp	Lys	Gly	Ser											385	390		

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Tyr Lys Asp Asp Asp Asp Ile Glu Gly Arg Lys Gly Val Ser Ile Asp
              20              25              30

aaa ttc cgt atc ttc tgc aaa gct aac ccg aaa aaa ggt ctg aaa ttc 144
Lys Phe Arg Ile Phe Cys Lys Ala Asn Pro Lys Lys Gly Leu Lys Phe
              35              40              45

atc atc aaa cgt tac acc ccg aac aac gaa atc gac tcc aaa ggt atc 192
Ile Ile Lys Arg Tyr Thr Pro Asn Asn Glu Ile Asp Ser Lys Gly Ile
              50              55              60

cgt gaa gac aac aac atc acc ctg aaa ctg gac cgt tgc aac aac aaa 240
Arg Glu Asp Asn Asn Ile Thr Leu Lys Leu Asp Arg Cys Asn Asn Lys
  65              70              75              80

ggt gaa aag aag atc gct aaa atg gaa aaa gct tct tct gtt ttc aac 288
Gly Glu Lys Lys Ile Ala Lys Met Glu Lys Ala Ser Ser Val Phe Asn
              85              90              95

gtt gtt aac tct aaa ggt ttc aac aac ttc acc gtt tcc ttc tgg ctg 336
Val Val Asn Ser Lys Gly Phe Asn Asn Phe Thr Val Ser Phe Trp Leu
              100              105              110

cgt gtt ccg aaa gtt tcc gct tcc cac ctg gaa aaa ggt cag tac atc 384
Arg Val Pro Lys Val Ser Ala Ser His Leu Glu Lys Gly Gln Tyr Ile
              115              120              125

aaa gct aac tcc aaa ttc atc ggt atc acc gaa aaa ggt gga tct ccg 432
Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Lys Gly Gly Ser Pro
              130              135              140

cat cat acc gcg ctg cgc cag gcg att ctg tgc tgg ggc gaa ctg atg 480
His His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu Leu Met
  145              150              155              160

acc ctg gcg aaa gga tct ccg aaa tat gtg aaa cag aac acc ctg aaa 528
Thr Leu Ala Lys Gly Ser Pro Lys Tyr Val Lys Gln Asn Thr Leu Lys
              165              170              175

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ctg gcg acc aaa gga tgc ttt ttt ctg ctg acc cgc att ctg acc att 576
 Leu Ala Thr Lys Gly Ser Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile
 180 185 190

 ccg cag tct ctg gat aaa ggc tat tct ggc ccg ctg aaa gcg gaa att 624
 Pro Gln Ser Leu Asp Lys Gly Tyr Ser Gly Pro Leu Lys Ala Glu Ile
 195 200 205

 gcg cag cgc ctg gaa gat gtg aaa gga tct cag ccg tct gtt cag att 672
 Ala Gln Arg Leu Glu Asp Val Lys Gly Ser Gln Pro Ser Val Gln Ile
 210 215 220

 cag gtg tat cag ggt gaa cgt gaa atc gca tct cat aac aaa gga tcc 720
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 taa 723

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 35 40 45

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 50 55 60

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 65 70 75 80

 Gly Glu Lys Lys Ile Ala Lys Met Glu Lys Ala Ser Ser Val Phe Asn
 85 90 95

 Val Val Asn Ser Lys Gly Phe Asn Asn Phe Thr Val Ser Phe Trp Leu
 100 105 110

 Arg Val Pro Lys Val Ser Ala Ser His Leu Glu Lys Gly Gln Tyr Ile
 115 120 125

 Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Lys Gly Gly Ser Pro
 130 135 140

 His His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu Leu Met

145		150		155		160									
Thr	Leu	Ala	Lys	Gly	Ser	Pro	Lys	Tyr	Val	Lys	Gln	Asn	Thr	Leu	Lys
				165					170					175	
Leu	Ala	Thr	Lys	Gly	Ser	Phe	Phe	Leu	Leu	Thr	Arg	Ile	Leu	Thr	Ile
			180					185					190		
Pro	Gln	Ser	Leu	Asp	Lys	Gly	Tyr	Ser	Gly	Pro	Leu	Lys	Ala	Glu	Ile
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Gln	Val	Tyr	Gln	Gly	Glu	Arg	Glu	Ile	Ala	Ser	His	Asn	Lys	Gly	Ser
225					230					235					240